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ARE THERE ANY SENSATIONS?

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Are we not ready to dispense with the element of sensation in systematic psychology? Several lines of argument suggested by the present trend of psychological investigation lead to such a conclusion. The first of these is modern phenomenology. The second is the attack which has been made upon conscious entities by the behaviorists; and the third is the newer views of neurology, especially as they have been formulated by Henry Head and his associates.

I. The high points in the history of psychological experimentation, in so far as it has dealt with the nature of consciousness, have been, successively, the analysis of sensation, the investigation of memory, the attempt to bring the higher thought-processes under experimental control, and, lastly, the phenomenology of perception. In his account of the last Congress for Experimental Psychology which met at Marburg in April, Hans Henning tells us that a new psychology is now being born. "Until the turn of the century," he writes, "it was believed that one could grasp the mind with number and measure. This was the direction of the Wundtian School; however, few papers of this sort were to be found on the Congress programme; for since 1900 there has developed a qualitative psychology which concerns itself less with numbers and more with kinds of experience and qualitative analysis. One knows to-day that the complications and structure of experience can not be analyzed into simple qualitative elements and thus built up by joining one to another, but that one must work constantly with psychical forms (*Gestalten*)."

It is the investigation of these formulated structures that has led to a conception of psychological integration,¹ the elemental constituents of which are not psychical entities but aspects of an attributive order.

Even the earlier introspectionists were sometimes loth to admit that consciousness, when examined in cross-section, could be analyzed into so many entities, joined like the parts in a jig-saw puzzle. James, for instance, in his *Principles of Psychology*,² maintained that the taste of lemonade is some-

¹See footnote next page.

²II, 2.

thing fundamentally different from sweet added to sourness, coldness, aroma, etc. The doctrine of mental chemistry, advanced to cover such synthetic discrepancies, was never entirely satisfying, because analogies of this sort are always inadequate to the factual data, and likewise for the reason that the chemical analysis of a compound into its elements is, indeed, exhaustive. The characteristics of water are the characteristics of its constituent parts, hydrogen and oxygen, and both these gases are susceptible of isolation and investigation. In the case of perception, however, analysis is more baffling; for the sensations therein contained reveal "aspects" such as extensity, intensity, and quality; and the entities or "contents" of which the perception is presumed to be made up can not be readily and individually isolated.

Although the logic of analysis is the same whether one analyse a material substance or a mental object, the constituents in the two cases are and remain distinct; and if it be the same objects of experience that give rise alike to the inferences of chemistry and the inferences of psychology, the inferences themselves are vastly different. One can carry over from one science to another the logical method and procedure, but never the precise point of view nor the existential data and technique of observation.

Perhaps we may regard the existential datum of all experience as a complex, having many facets, which, when viewed from diverse angles, reveals for each a unique phenomenological unit. It then becomes the problem of any special science to record the phenomena occurring under its view of the whole, and to infer the underlying order which constitutes the unity peculiar to its angle of observation.

Such an attempt was made in the older analyses of the conscious cross-section into sensations, images, and feelings. But the prejudice of quantification was too strong upon these earlier analysts; and their efforts were unsuccessful because an ex-

¹The use of the term *integration* is derived from the writings of H. J. Watt; cf. *Some Problems of Sensory Integration*, *Brit. Jr. of Psychol.*, 1910, 3, 323ff. "An intimacy of connexion between *nerve-paths* or impulses emanating from different sense organs is, of course, recognized in many forms. But this connexion has been somewhat exclusively considered to consist in a mere *coordination* or association of afferent and efferent impulses with one another. Sufficient attention has hardly been paid to the possibility that upon these afferent impulses an afferent structure might be raised which is dependent upon but essentially an addition to these. To distinguish it from mere coordination such a structure might well be called *integration*" (323 f). See also "The Elements of Experience and their Integration: or Modalism," *Brit. Jr.*, 1911, 4, 127 ff.; and "The Main Principles of Sensory Integration," *ibid.*, 1912, 6, 239ff., from which the following sentence is taken: "So the word *integration* may imply the general theory of the relation of a mode (*Gestalt*) to its basis in experience, which psychology may hope some day to attain" (247).

haustive procedure of weighing and measuring was obviously impossible. The mental object or phenomenon which furnished the point of departure was always existentially complex. However simple it might be rendered under the conditions of experimental control, it still persisted in remaining an object with a certain self-constituted 'thingness' about it. The greater its simplicity, the more definitely it might be described; yet the absolute simplicity of a single mental entity, to be taken up and examined apart from every other entity of mind, always eluded one's grasp. Were its color to be observed, the color must also have shape and size, or at least area; it must possess a certain brightness of intensity and a certain duration. Even a slight variation in one of these aspects might be sufficient to alter the entity so profoundly that it at once became something else.

As Titchener has pointed out in his paper on *Sensation and System*, "the sensation of classification is the logical resultant of many observations. Its qualitative attributes are (in the typical case) points selected by definite procedure from a continuum; its intensive attributes are themselves continua, reduced by the same procedure to a series of points. Hence, the conjunction of the qualitative attributes with any points whatsoever upon the correlated intensive scales constitutes, for classification, 'a' sensation; the bracketing together of the qualitative attribute with the complete intensive scales constitutes 'the' sensation. It would be a great simplification of psychology if a sensation, *tota, teres, atque rotunda*, would stand before us under a single comprehensive determination and allow us to observe it as a whole. But that, if it ever happens, happens only after we have made many separate observations of its distinguishable aspects."³

The question raised by my paper is one of doubt as to the genuineness of the hypothetical elements of sensation. Even since Titchener wrote in 1915 the investigation of the psychological nature of perception has revealed some of the characteristic integrations of attributes which constitute the fundamental patterns of attentional awareness. If a perception in its bare phenomenal essence is not found to be an aggregate of sensory elements, but an integrated unit, which upon analysis is reduced to a number of attributive aspects rather than to a number of individual conscious particles, it would appear that the elemental sensation can be experienced only under a determination of perception; and that, in so far as it can be perceived at all, it is a percept in the same way that 'movement' or 'wetness' or 'the taste of lemonade' is a percept. As Rahn states the case, "sensory consciousness is no simpler than, but equally

³This JOURNAL, 26, 1915, 261.

as complex as, any other type of consciousness, and the laws of its coming and going are the same as those for the rise of any other form."⁴

To be sure, the perceptual patterns from which we derive our awareness of objects are not all of equal simplicity. In the different modalities of sensation, different types of integration are possible. One might assume for the purpose of defining a sensory element that it should consist in the integration of those attributes that characterize the modality under consideration whenever each enters into the unit once and once only. Thus a simple tone or element of sound would have one pitch-brightness, one volume, one intensity, and one duration, whereas a tonal fusion would be a more complex integration in which at least two attributes of pitch-brightness are involved. But there is still no evidence that this hypothetical entity ever appears in consciousness as a bare sensation, or that it would possess any special significance, apart from its logical simplicity, if and when it did. Indeed, within limits, the attributes of intensity and duration are relatively unimportant as compared with those of pitch-brightness and volume. The bare *quale* of the tone or of the fusion may be equally simple as psychological datum prior to the analysis which reveals the conditions under which the two are aroused.

But even if we accept this logical definition, may it not lead us into further difficulties? Not only is the elementary sensation to be marked off from those units of experience, like fusions, in which one attribute is used twice over; it must also be set off from other units in which the full quota of attributes belonging to a given modality is not involved in the integration. Thus visual movement as defined by Dimmick⁵ is but *duration* and *quality*. *Extent* and *intensity*, which also enter into the definition of a visual sensation, are not essential to movement. Of course, the other attributes characteristic of the sense-modality might be 'found' if one were to search them out, but this would be another problem than that of observing the phenomenon of movement. If it be argued that in the first case we are analyzing the phenomena of a mental 'function,' and in the other the phenomena of a mental 'structure,' are we doing more than piling up logical distinctions? We might say that the 'functional' pattern of movement concerns some of the attributes, but not others; that the 'structural' pattern of a mental element concerns each attribute used once over; and that the more elaborate patterns of fusions and complications involve attributes used twice over, and may extend beyond the modality of one department of sense. Yet in each of these cases the unit of sensory

⁴Cf. Sensation in Contemporary Psychology, *Psychological Review Monogr. Series*, No. 67, 1913, 107.

⁵*This Journal*, 31, 1920, 317 ff.

experience remains an abstraction of certain attributes which integrate to form a conscious *quale*, and this *quale*, under an appropriate attitude of observation, is as genuine an element of experience as any other. It therefore appears that the primary integration of attributes which determines the original units of sensory experience may embrace either more or less than the full complement which has been logically assumed to define the sensation.

II. The movement known as behaviorism falls outside the scheme of development which has accepted the analysis of consciousness as its chief task. It is nevertheless a logical consequence of the earlier efforts to measure mind, and the ease with which many psychologists have accepted the principles of behaviorism seems to indicate an inherent difficulty in the conception of sensation by the readiness with which the stimulus is accepted in its place. The radical programme of the behaviorist, which denies the scientific validity of all contents of consciousness, has contributed its part toward weakening the position of the conscious element by the destructive criticism leveled against the older notions of mental processes. However, in confining its investigations to stimulus and response, behaviorism has raised new problems which it must be prepared to face if the restricted means with which it proposes to operate in its investigations are to prove adequate in the solution of its problems.

Two points occur to one in which the means commonly employed by the behaviorist seem deficient in the attainment of his ends, the one being his failure to control the mediation between stimulus and response, while the other arises from inexact knowledge as to the nature of the stimulus itself. The dependence of the integrative patterns of perception, and likewise those of ideation, upon definite conditions of arousal from without and equally definite conditions and states of neural, muscular, and glandular receptivity and response from within, may, however, furnish that understanding of the mediation between stimulus and response without which we are so often at a loss to predict the behavior of an organism even under objective conditions that have been well defined and carefully controlled. As Boring has pointed out in his recent paper on the *stimulus-error*, "if only the end-terms of stimulus and response are controlled, a universal one-to-one correlation between stimulus and response is not possible"; and he goes on to say that the "only way out of the dark would be to study the effect of stimulation, of attention, and of criterion by taking hold of these dependent series at their intermediate points, thus providing ourselves with a more complete knowledge and control of the entire psycho-physical situation."⁶

⁶This JOURNAL, 1921,32, 449 ff.

The attempt to attain this "complete knowledge and control of the entire psychophysical situation" through study of psychological integration—rather than by assuming such artifacts as sensations and images, bound together by the chains of association—seems promising also with regard to the exact nature of the stimulating situation. In abandoning mental elements in favor of attributes of experience we are able to deal exclusively with psychological continua having a definite context in the objective conditions of stimulation and likewise in the apparatus and mechanism of response. For this reason the psychology of integration should prove a more serviceable instrument to the behaviorist than the psychology of mental elements which he now so cheerfully forswears. At any rate the student of behavior must be ready to fractionate his stimulus and study the influences upon his subject's response exerted by varying intensities, extensities, durations and the alteration and combination of sensory modalities. In so doing he will necessarily follow the procedure of the psychologist who continues to find his problem in the observation of attributive aspects and in the conditions that govern their integration.

III. With respect to Head's newer views of neurology⁷ I speak with some diffidence; but I think it worthy of note that a distinction may and perhaps must be drawn between the sensory impulse and the resultant sensation. A parallel is suggested also between the psychological integration of which we have been speaking and the physiological integration of Head's theory.

Realizing that Head's results are still a subject of controversy, and that my own equipment as a neurologist is too meagre to give them adequate evaluation, I shall not attempt to seek any large measure of support for my thesis in this quarter. Yet when Head tells us that "psychological analysis fails entirely to disclose the struggle of sensory impulses revealed by (his) experiments",⁸ we are at least challenged to consider his conclusions. In brief, Head maintains that "integration occurs as impulses pass from the periphery toward the higher centres; the change (being) a constant one from a complex to a simpler and more specific grouping," so that "sensation, the final end of the process, assumes forms simpler than any sensory impulses."⁹ Again from this angle of approach we are invited to question the validity of sensation as we have been wont to conceive it. The precise sensory mechanism put forward by Head may or may not be acceptable, but upon superficial inspection it seems to be quite as plausible as the contrary view

⁷Cf. *Studies in Neurology*, London, 1920.

⁸*Op. cit.*, 329.

⁹*L.c.*

that an impulse started in a specific end-organ travels unchanged to the highest receptive centre where it supplies the neural correlate of the sensory element of experience.

Still another point is suggested by Head's reference of affection to the optic thalamus. The anomaly of feeling as an element in consciousness has been frequently discussed; for feeling lacks the objectivity that belongs to the hypothetical elements of sensation and image. Yet the acceptance of *affection* as an attribute has been equally unsatisfactory, because it is not an invariable accompaniment of the elements, otherwise supposed to be fully described in terms of their attributes. If, however, we shift our mode of attack, and regard affection as a phenomenon of psychological integration, we may find it no more remarkable that we should be affected by certain integrations than that the integrations themselves should be compulsory in provoking distinctive psychological units of experience. Perhaps, too, the problem of the image would be better solved if we were to give up the attempt to discover its textural difference from sensation and limit the investigation to its phenomenological make-up as an integration of attributes taking place under certain definite conditions of experience.

In the programme of research here proposed we may still take general classes of sensation as a point of departure, though we should no longer be striving to reconstruct mental life as a certain number of conscious entities merely joined one to another in a mosaic of sensory particles. Rightly considered, even this analogy is more adequate to the facts of experience than was originally intended; for the mosaic has a pattern which the artist follows in the selection of his pieces of stone. Likewise, in the living organism, the pattern of the whole dominates the accretion of minor parts. To resolve the whole into its parts without regard to their relatedness in the original is to violate the principle of analysis. We do not go to the mosaic to study the nature of stones, but to study the nature of design. When the whole is broken up into its constituent pieces there is no design left. To attempt to understand the nature of mind by breaking it up into hypothetical elements is still more futile, because the elements themselves either disappear, or reconstitute themselves in a new type of experience which is a different subject of analysis from the one with which we started.

But if we take the perceptual pattern as our basis of analysis and study its attributive aspects under conditions which we can control, it may be that the varied integrations of these attributes will reveal to us the fundamental patterns underlying all experience. We shall be dealing with the only elements of mind that are capable of treatment in isolation one from another, and at the same time in intimate dependence upon physical

conditions that can be exactly measured. Thus there seems hope for a common meeting ground between the investigator who by temperament and scientific interest insists upon limiting his field of research to the tangible data of the physical universe, and the investigator who finds his problem restricted to the phenomena of consciousness. While a reconciliation is hardly to be expected, or even perhaps to be desired, it is nevertheless of interest to the cause of science that all should work toward a common end; for surely no gain can arise from a flat refusal to admit the possible justification of another point of view than one's own.